

DETAILS

1. Persons Contacted

- *D. L. Cornell, Manager, Manufacturing
- *M. G. Hill, Supervisor, Chemical Operations
- *R. H. Purcell, Manager, Auxiliary Operations
- *R. L. Miles, Supervisor, Radiological Safety
- *H. P. Estey, Manager, Licensing and Compliance, Operating Facilities
- *R. H. Schutt, Specialist, Criticality Safety
- J. W. Green, Project Engineer
- E. R. Herz, Safeguards Specialist

*Denotes those attending the exit interview.

2. Facility Changes and Modifications

The licensee had installed and was operating a uranium contaminated clothing laundering facility. The laundry was being operated on a trial basis. Experience was being gained on fixed versus removable contamination, uranium content of waste products, and other parameters.

Two geometrically safe slab type tanks which had bulged (NRC Report No. 70-1257/79-09, dated January 11, 1980) had been replaced. A structural analysis of the new tanks had been performed. As analyzed, the structural integrity of the tanks depends upon absolute venting. A 1½ inch overflow was connected to the vent lines of the tanks immediately above the top of each tank. Additionally, each tank is equipped with a 2" by 2" inspection port at the top which is free to "float" should pressurization occur within the tank. Both tanks are fabricated with tiepins connecting the large faces both to establish and to preserve the safe dimension.

At the time of this inspection two 20" diameter ion exchange columns had been installed in conversion line #2 for final cleanup of contaminated liquids before release to the liquid waste storage lagoons. Permission to operate the 20" diameter ion exchange columns has been granted by amendment to the subject license. Additional quarantine tanks of geometrically safe dimensions had been added to the waste handling system.

3. Internal Review and Audit

This inspection included a review of criticality safety audits performed by representatives of Auxiliary Operations and of Licensing and Compliance. The review extended from November 14, 1979 thru April 4, 1980. Over that period of time ten reviews were made by Auxiliary Operations. Those reviews were addressed to all facilities on site and were conducted at the required frequency. Discrepancies found in the Auxiliary Operations reviews included mislocation of fissile material; missing fissile material inventory sheets at operating stations; and the presence of unauthorized containers. Those matters were corrected at the time of the review and by written notification to area managers.

During the same period of time reviews were conducted by Licensing and Compliance at the required frequency and were addressed to all facilities at the licensed site. Those reviews, which were conducted by criticality specialists, disclosed primarily the mislocation of stored UO₂. Both types of reviews make use of written communication to area managers regarding discrepancies which communications require written reply.

Additional audits and reviews directed specifically to radiation safety are conducted by a representative of Licensing and Compliance. They are conducted at a frequency ranging from once per month to once each two weeks. A review of reports of those radiation safety audits indicated that eight reviews had been conducted between October 1979 and March 1980.

4. Operations Review

This inspection included visits to the UF₆ conversion line #3; scrap recovery area; the U308 and UNH facilities; room 100 pellet production and storage areas; scrap material storage building. All those areas gave the appearance of good housekeeping with the exception of the so-called conversion line 3 powder storage area. That area was being used simultaneously for the storage of UO₂ powder; a "cold" plumbing shop; and for the accumulation of low level waste containers. Those circumstances give the appearance of disarray.

The licensee had applied a black and white "tile" tape bordering those areas and conveyor lines within which moderation criticality control was being used.

A large inventory of used HEPA filters had accumulated in the scrap material warehouse and were presenting a space storage problem. That accumulation resulted from the licensed land burial site refusal to accept spent filters packaged in cardboard boxes. The licensee was studying other possibilities of disposal at the time of this inspection.

5. Radiation Protection

This inspection included a review of contamination surveys conducted in the UO₂ building from January thru March, 1980. The review indicated that direct readings of contaminated surfaces ranged from 2000 to 20,000 dpm/100 cm². Removable activity from those surfaces ranged from 1,000 to 10,000 dpm/100 cm². That experience was in controlled areas of the UO₂ building. The surveys indicated that decontamination was required approximately once each week to maintain a removable level ranging from

1,000 to 5,000 dpm/100 cm². Lunch room and change room activities were reported as less than 200 dpm/100 cm² fixed activity and less than 200 dpm/100 cm² removable activity.

This inspection included a review of air sample data acquired in the UO2 building, the ELO building and the MO building. That data was for the fourth quarter of 1979 and was typical of operations at those facilities. A brief review was also made of similar data for the first quarter of 1980.

The air sample data was arranged by location of samples; average airborne concentration calculated with respiratory protection factors; average concentration without respiratory protection factor and maximum concentration experienced at that location. The average concentrations with and without respiratory protection factor were quite similar indicating that the high samples were relatively infrequent occurrences. The highest concentrations invariably occurred in the UF6 conversion facilities, scrap recovery, and outer production areas. The average airborne concentrations with and without respiratory protection for the fourth quarter of 1979 were all less than 5×10^{-11} μ ci/cc. The maximum individual sample experienced was in the conversion line two area and was approximately 1×10^{-8} μ ci/cc.

This inspection also included a review of urinalysis bioassay results for the first quarter of 1980. During that first quarter approximately 543 urine bioassay samples were obtained and analyzed. Of that number approximately 46 samples gave positive results. The highest positive result was 113 μ g U/l obtained on January 31, 1980. A resample obtained on February 1, 1980 indicated less than the limit of detection of 10 μ g U/l. A sample obtained on February 8, 1980 indicated 40.6 μ g U/l and a resample obtained on March 10, 1980 indicated less than 10 μ g U/l. All other results were at or below the licensee's action level of 25 μ g U/l.

At present the licensee obtains 12 uranium bioassay samples per year from radiation workers. The workers also receive one lung count each year.

Upon license renewal the NRC plans to require the licensee to calculate his quarterly average airborne concentrations without applying a respiratory protection factor. The licensee plans to conduct a study of breathing zone concentrations using lapel air samples and to thereby relocate fixed air sample stations. Air sample stations are presently placed at the location of highest concentrations rather than at the breathing zone. The licensee believes that relocating the samples will result in a lower measured airborne concentration of uranium which will be more accurate in terms of exposure evaluation.

Laboratory samples of sludge from the licensee's protective clothing laundry indicate approximately 17 grams of uranium per 40 pounds of sludge.

6. Expression of Concern by Former Exxon, Richland Plant Employee

NRC Region V was informed by a former employee of the licensee that he believed he might have been overexposed to radiation during his employment there. This inspection included a review of that employee's exposure history during his employment. That review indicated a total whole body exposure to penetrating radiation of 180 mrem and whole body skin penetrating plus non-penetrating exposure of 220 mrem. The employee experienced no extremity exposures. Whole body and lung counts performed upon termination indicated no internal exposure to radioactive materials. Six urine bioassay samples obtained upon hire, routine sampling, and upon termination all indicated less than 10 μ gu/l.

A review of training records indicated the employee had received lectures on radiation protection, emergency procedures, and respiratory protection during his employment with the licensee.

The employee was notified of his total exposure during employment by letter dated February 25, 1980 according to the requirements of 10 CFR 20.408.

The employee is identified in enclosure A to this report.

7. Safety Features on 20 Inch Diameter Ion Exchange Columns

The licensee was installing three, 20 inch diameter ion exchange columns for use in conversion line 2. The columns will be critically safe by virtue of concentration control and administrative control. This inspection included a review of progress with the installation of those columns and auxiliary equipment to provide assurance of concentration control. That auxiliary equipment had not been completely installed at the time of this inspection and the system had not yet been tested. Licensee's plans are to include the auxiliary equipment in his preventive maintenance program.

The ion exchange columns are intended for removal of enriched uranium from liquid waste which, in the past, has been sent to the licensee's liquid waste lagoons. Those wastes are stored in geometrically safe quarantine tanks. Those tanks are being provided with a permit switch which is key operated and is located near the quarantine tank sample port. The licensee's intention is to prevent pump out activation before obtaining a sample from the quarantine tanks.

The liquid waste passes through a pre-filter prior to entry into the ion exchange columns. Two pre-filters are provided and the ΔP across each filter shifts the flow to the other filter. If both pre-filters are plugged the wastes are automatically diverted to the lagoons.

A continuous turbidity measurement is made on the liquid waste flow to the ion exchange columns which measurement is a good indication of uranium content.

A continuous measurement of uranium content is made at the resin column discharge.

The ΔP is measured across each ion exchange column to show plugging of the resin bed. An elevated ΔP gives an audible alarm.

The licensee plans on a nitric acid concentration control at 2N at the time of nitric acid makeup. If greater than 2N acid is placed in the makeup tanks, the makeup tank valves automatically close. The licensee is assuring himself that nitric acid at greater than 2N concentration cannot be delivered into the conversion line two area.

8. Waste Management

The licensee has routinely evaporated low uranium concentration liquid waste in lagoons located on the Richland Plant Site. Lagoon liners have been suspected of leakage and that circumstance has been reported in previous inspection reports. The lagoons are being relined and provided with special sampling lines underneath the liners both to prevent further leakage and to monitor for leakage.

During the relining of lagoon #2 several holes in the original liner were found and core samples were obtained in the base of the lagoon at those locations. The samples were analyzed for uranium content and a volume integration was performed indicating the possibility that 70 kilograms of low enriched uranium had penetrated the base of lagoon #2. Upon relining lagoon #3 a similar program was followed and it was estimated that about 540 kilograms of low enriched uranium may have penetrated the base of lagoon #3.

During this inspection this matter was discussed with licensee representatives from the point of view of material accountability and from the point of view of environmental impact. Licensee representatives indicated that the calculated deposition of uranium in lagoons #2 and 3 were of sufficient accuracy to account for certain material inventory differences but could not be used to say conclusively that the quantities of uranium indicated were actually in the base of the two lagoons. There was no indication that the licensee would attempt to retrieve the uranium.

It was observed that the licensee has numerous wells used for sampling ground water down stream of the lagoons. That sampling is part of the licensee's environmental surveillance program and gave the first indications that the lagoons might be leaking because of the presence of nitrate ion. Licensee representatives indicated that well sampling would continue on a routine basis and that any migration of uranium of a significant nature would be detected in that manner. There has been no indication that significant quantities of uranium have reached the ground water system from the lagoons.

9. Management Interview

The scope and the results of this inspection were discussed with licensee representatives on April 23, 1980. Those persons were informed that no items of noncompliance or deviations were observed within the scope of this inspection.